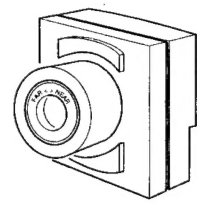
CCD Colour Observation Camera

VCM7137/00T

Service
Service
Service

VCM7177/00T
TC71375T
TC71775T
VC71375T
VC71775T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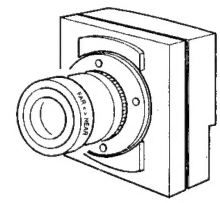
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NORTH-AMERICAN MODELS:
Service Manual: 8098

Service Manual

Contents

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PHILIPS

1. Introduction

These VM7-Cam is a family of CCD Colour Observation Cameras which is derived from the X1-C family.
This VM7-Cam family covers following type of cameras:

VCM7137/00T	fixed lens 4 mm F1.2
VCM7177/00T	CS lens 4 mm F1.2
TC71375T	fixed lens 4 mm F1.2
TC71775T	CS lens 4 mm F1.2
VC71375T	fixed lens 4 mm F1.2
VC71775T	CS lens 4 mm F1.2

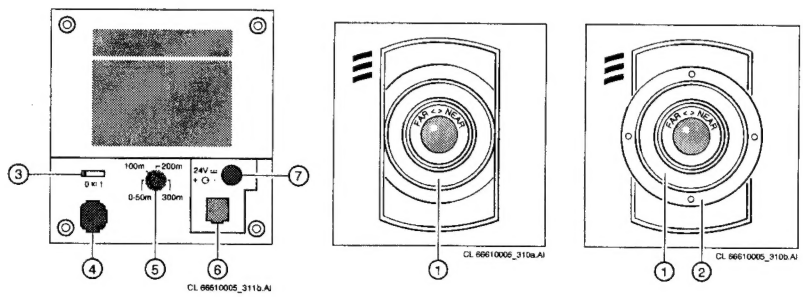
All the cameras can be used in combination with a protecting cover (VCM1152).

2. Technical Data

Power supply voltage	24 V DC , as supplied by the observation system monitor, connected with max. 200 m / 600 ft or 300 m / 900 ft (via external power).
Power consumption	≤ 3 W
Ext. Power source	Any approved DC voltage generator of 24 V DC, 500 mA in case that the cable length exceeds 200 m / 600 ft.
System cable	4-wire twisted pair of telephone cable (16 Ω/0100 m) (25 m included in the carton).
Video output	2-wire interface via system cable. diferential mode 175 mVpp.
Sound output	2-wire interface via system cable. common mode 500 mVpp.
Microphone	Built in, electret (can be switched off at the camera).
Synchronization	Automatically to the monitor
Pick up element	1/3" Solid state CCD NTSC : LZ23132 PAL : LZ23232
Picture elements	512(H) x 492(V) for NTSC 512(H) x 582(V) for PAL
Resolution	330 TVL
Iris	Electronic and DC controlled auto Iris lens.
Gain control	Automatic 20 dB.
Light sensitivity	
• for fixed lens:	8.3 lux, 50 IRE (-6dB) at F2.0, 3200K (lens transmission 86%, scene reflection 100%)
• for CS mount lens:	3.0 lux, 50 IRE (-6dB) at F1.2, 3200K (lens transmission 86%, scene reflection 100%)

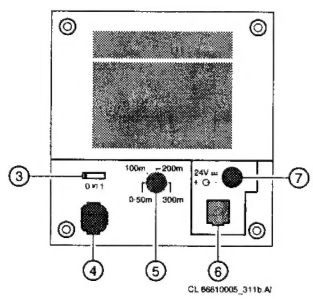
Lens	Fixed lens	CS-mount
Mounting	—	CS standard
Image format	1/3"	1/3"
Focal length	3.8 mm	4 mm
Angles of view	73 deg.	61 deg. horizontal
	54.8 deg	48 deg. horizontal
Relative aperture	F2.0	F1.2
Focus	1m-infinity	adjustable
Dimensions (HxWxD)	72 x 70.5 x 69.5	72.5 x 70 x 60
Weight	183.5 gr.	190 gr.
Ambient temperature		
Operating	-10° to +50° Centigrade.	
Storage	-25° to +70° Centigrade.	
Ambient humidity		
Operating	20 to 90 % RH	
Storage	up to 99 % RH	
Service policy	First line service: Board swapping using simple diagnoses, see chapter 11 for the details. Second line service: Central repair at factory, see chapter 7 for the details.	

3. Control Functions



1. Focus ring
2. Back focus ring
3. Sound on/off switch
5. cable length selector

4. Connections



4. Auto iris socket
6. System cable socket
7. External power socket

5. Warnings and notes

WARNINGS

1. **NEVER measure directly at the output of the CCD image sensor.**
   It will destroy the sensor immediately.

2. Safety regulations require that the unit should be returned in its original conditions and that components identical to the original components are used. The safety components are indicated by the symbol ▲

3. All ICs and many other semi-conductors are sensitive to electrostatic discharges (ESD). ⚠
   Careless handling during repair can drastically shorten the life. Make sure that during repair you are connected by a pulse band with resistance to the same potential as the earth of the unit.
   Keep components and tools also at this same potential.

4. When making settings, use plastic rather than metal tools. This will prevent any short-circuit and the danger of a circuit becomes unstable.

5. Always switch off the set before replacing any of the components or separating the PW boards.

6. Never aim the camera at the sun or other extremely bright light sources.

NOTES:

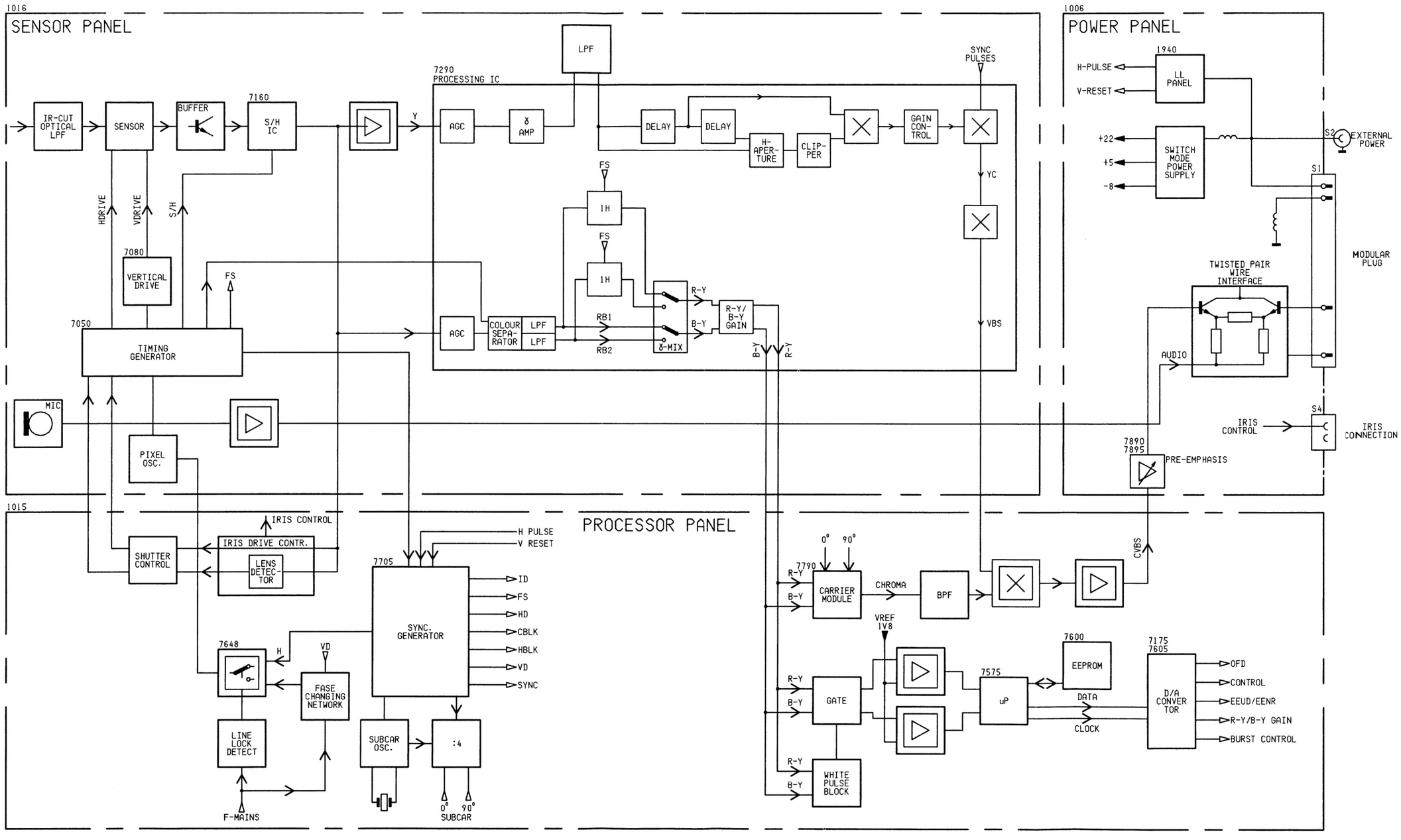
1. This manual is prepared for all types of cameras (known at this moment) within this VM7-Cam (derived from the X1- C family range.
   The types are mentioned in the Introduction chapter.
   This manual support the board swapping repairs.

2. For alignments please order and refer "**Alignment** Software Guide " for X1-Colour camera, service code is 4822 727 20001. This guide also includes the software on 3.5" floppy.
   A brief description is also presented in this manual.

3. Be attentive at the cable (item 53) connecting connectors P3 on processor board and S3 on power board.
   The cable can be connected in both directions.
   The correct way to connect the cable is that the blue indication of cable should be visible from top while inserting it in connector P3 on processor board. Then the cable should be connected to S3 on power board without any bend. The blue indication of cable on power board side will be at bottom side.
   If the cable is wrongly connected the camera will not function but there will be no damage.

4. In order to remove the power board, desolder the external power socket S2, because it is screwed into the backcover (inside).
   The Power Board can be now taken out.
   Before start repairing connect short circuit pin 2 and 3 of plug S2 on the power board !!

6. Block diagram



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19 0996

7. Service policy

The Service policy for this product is :
board swapping (for sensor & processing panels) as first line service. It means only replacement of the defective board. In case of necessary repairs, the defective "repairable" boards must be returned to Philips Consumer Service according the central repair procedure.

This camera type contains one assembly, which can be repaired centrally via the so called "central repair procedure".
The relevant panels are mentioned under the heading "Repairables" in chapter 12 (spare parts list).
The central repair procedure has been introduced to guarantee a fast, efficient and correct repair of panels or assemblies with complex circuitries or new technologies.

Central Repair Procedure:
Contact your local service organisation to obtain a repairable board. After confirmation a replacement panel or assembly will be sent to you. Send the defective panel or assembly inclusive a "(standard) repair form" to your local service organisation.
The defective panel should be correctly packed inclusive ESD protecting material. The original packing of the returned/replacement panel can be used for this purpose.
The accompanying "repair form" should contain all basic information such as:
- full model number of the set
- date of failure
- reporting country
- serial number/production code of the set
- description of the failure including timing indication (immediate, after ... minutes warming up, sometimes)

8. Service board

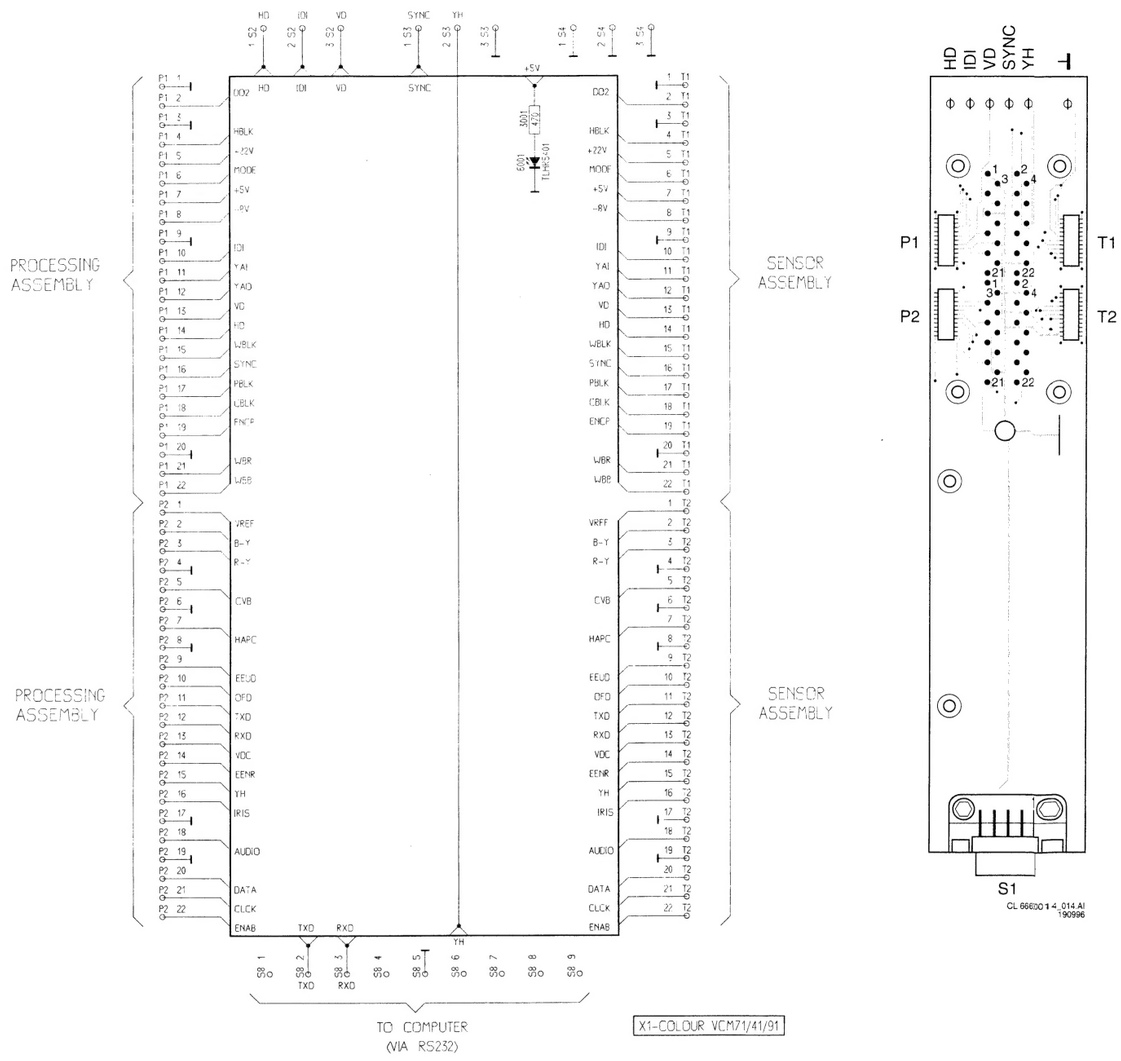
The service board 4822 212 30881 serves two functions:
1. An interface board between the computer and camera panels for electrical adjustments.
2. The extension board to do various measurements and repair on different panels.

The processor panel is to be connected to 22 pins male connectors on the service board and Sensor assembly to 22 pins female connectors. These panels can be tightened by means of screws and nuts provided along with the service board.
The Power board being connected to the processor panel should be also tightened by means of screws for mechanical stability. The service board can be connected to computer via RS232 9-PIN D- Shell connecter S8.
The LED on the service board indicates the right connection and supply. If it does not glow, check the connections and supply.

Signal descriptions:

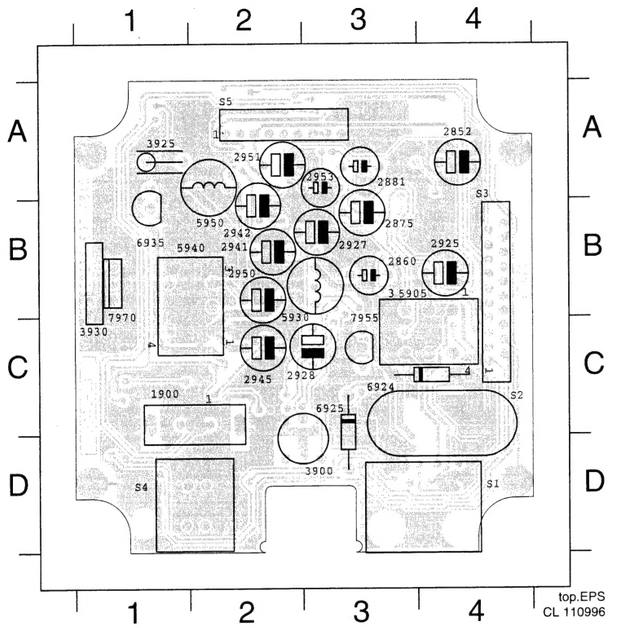
HBLK	Horizontal blanking pulse
VD	Vertical drive Pulse
HD	Horizontal drive pulse
WBLK	Wide blanking pulse
PBLK	Pre-blanking pulse
	CBLK
	Composite blanking pulse
ENCP	Encoder DC clamp pulse
WBR	White Balance Red
WBB	White Balance black
VREF	Reference voltage (1V8)
VBS	Video Blanking Sync. signal
HAPC	Horizontal Apperture Control
EEUD	A control pin for shutter speed
EENR	A control pin for shutter speed
OFD	Overflow drain voltage signal
TXD	Data transmission acknowledgment
RXD	Data receipt acknowledgement
YH	Luminance (high frequency)
IRIS	IRIS control signal
CLCK	Clock pulse for D/A converter
ENAB	DAC Enable
CONTR	Control voltage for IRIS-drive
DRIVE	Voltage for IRIS
LLOUT	Line lock output signal (Main ac-frequency)
LLIN	Line lock input signal (Main ac-frequency)
MODON	Signal to on/off modulator
AD0..AD3	Address bits to select the camera
HEXT	External line frequent signal for H-synchronisation
VEXT	External frame frequent signal for V-synchronisation
CVBS	Chroma (composite) Video Blanking signal
D02	9.5 MHz clock
VOC	Control voltage for pixel oscillator

Service board



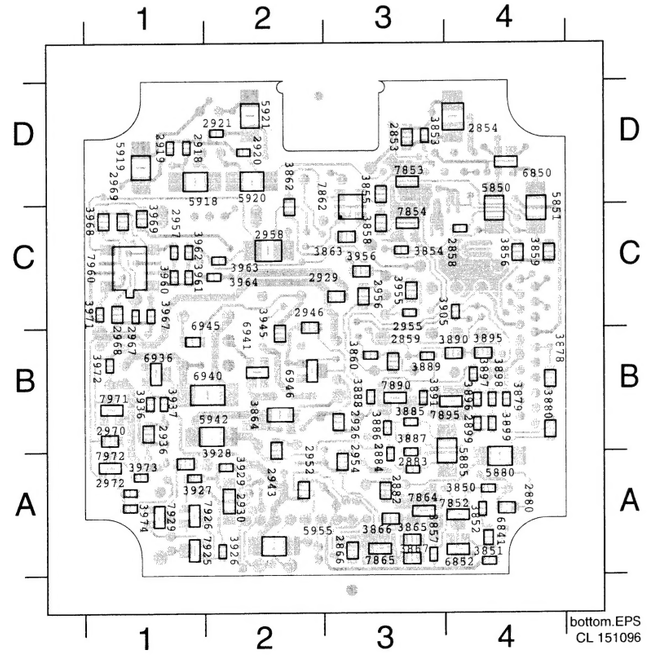
9. Power panel board

Component side



1900 C1
2852 A4
2860 B3
2875 B3
2881 A3
2925 B4
2927 B3
2928 C2
2941 B2
2942 B2
2945 C2
2950 B2
2951 A2
2953 A3
3900 D3
3925 A1
3930 B1
5905 B3
5924 C3
5930 B2
5940 B1
5950 B2
6925 C3
6935 B1
7955 C3
7970 B1
S1 D4
S2 C4
S3 B4
S4 D1
S5 A2

SMD-side

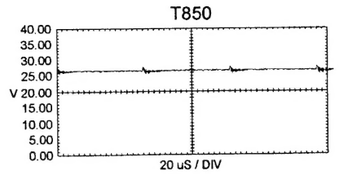


2853 D3
2854 D4
2858 C4
2859 B3
2866 A3
2880 A4
2882 A3
2883 C3
2884 A3
2899 B4
2918 D1
2919 D1
2920 D2
2921 D2
2926 B3
2929 C3
2930 A2
2936 B1
2943 A2
2946 C2
2952 A2
2954 A3
2955 C3
2956 C3
2957 C1
2958 C2
2967 B1
2968 B1
2969 D1
2972 A1
3850 A4
3851 A4
3852 A4
3853 D3
3854 C3
3855 D3
3856 C4
3857 C3
3858 C3
3859 C4
3860 B3
3862 D2
3863 C3
3864 B2
3865 A3
3866 A3
3867 A3
3878 B4
3879 B4
3880 B4
3885 B3
3886 B3
3887 B3
3888 B3
3889 B3
3890 B4
3891 B3
3895 B4
3896 B4
3897 B4
3898 B4
3899 B4
3905 C3
3926 A2
3927 A1
3928 A2
3929 A2
3936 B1
3937 B1
3945 C2
3955 C3
3956 C3
3960 C1
3961 C1
3962 C1
3963 C2
3964 C2
3967 C1
3968 C1
3969 C1
3971 C1
3972 B1
3973 A1
3974 A1
5850 D4
5851 C4
5880 A1
5885 A4
5918 D1
5919 D1
5920 D2
5921 D2
5942 B2
5955 A2
6850 D4
6841 A4
6852 A4
6936 B1
6940 B2
6941 B2
6945 C1
6946 B2
7852 A4
7853 D3
7854 C3
7862 D2
7864 A3
7865 A3
7890 B3
7895 B4
7925 A2
7926 A2
7929 A1
7960 C1
7971 B1
7972 A1

Wave forms

Camera

T850



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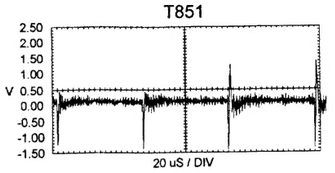

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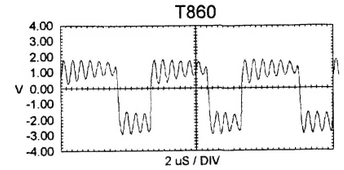

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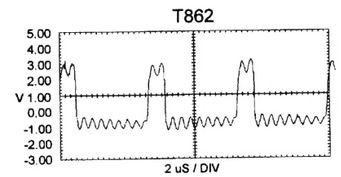

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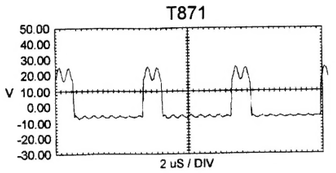

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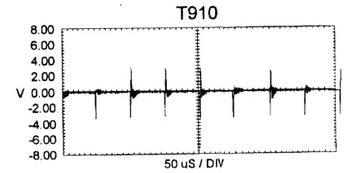

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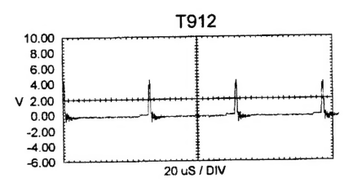

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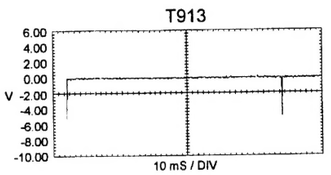

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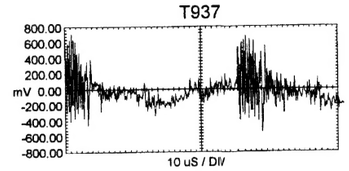
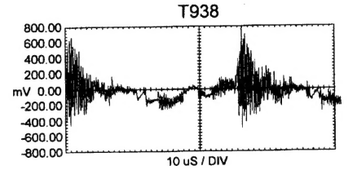
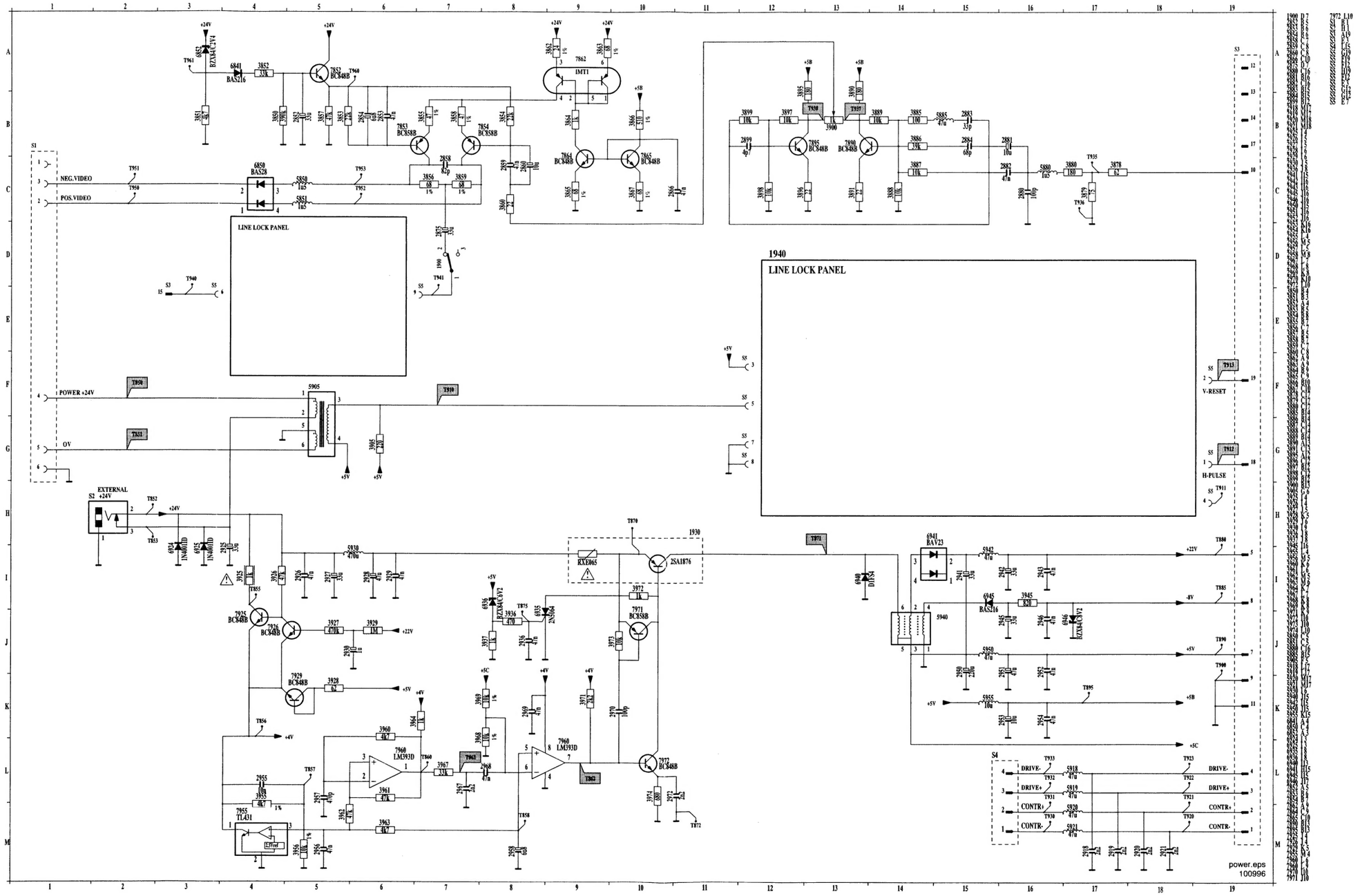


T938



Power panel circuit



10. Electrical Adjustments

The alignments are done by means of software which can be used on any AT, XT or notebook computer.
For detailed description of alignments please refer "Alignment Software Guide " for X1-Colour camera, service code is 4822 727 20001. This guide also includes the software on 3.5" floppy.
However, a simple method has been worked out to use the factory aligned panels with very little work. This will save tremendous time. The method is described here as follows:

- The factory will provide the aligned sensor assembly (with opto-block) and processing panel.

The aligned panels have different D/A converters (DACs) filled with certain decimal values.
The sensor assembly will be provided along with hard copy of all the DACs values. The DACs associated with Sensor assembly's alignment are marked with *.
The processor assembly will be also aligned but no hard copy of values will be provided. All the DACs values are stored in EEPROM, item no. 7800 on processor panel.

Case 1: Sensor assembly is defected, but processor assembly is o.k.

- Replace the defected sensor assembly by repaired one.
- Load the alignment software. Refer the alignment software guide instructions.
- Then enter the values of DACs bits 03, 12, 13, 15, 16, 17, 19, 20, 21, 22 & 23 (marked with *) as mentioned on the paper provided along with the assembly. These DACs bits are associated with Sensor assembly alignment.

Case 2: Processor panel is defected but the EEPROM 7800 is o.k.

- Load the alignment software program and read the DACs bits values as described in the software guide.
- Take the print out of these values.
- Replace the defected processor panel by the repaired one.
- Using software enter the old values of DACs marked with * on your print out i.e. of DACs bits 03, 12, 13, 15, 16, 17, 19, 20, 21, 22 & 23.

Case 3: If EEPROM 7800 is defected then you can not read the old values of sensor-associated DACs bits. Then you have to do the alignments yourself for these DACs bits. These alignments are described in the " Alignment Software Guide " for X1-Colour camera, service code is 4822 727 20001.

Note: The defect in EEPROM can be diagnosed by the alignment software on loading the program while different panels connected via service board.

11. Fault Diagnosis

The fault diagnosis is made on board level.
Letters V,W,X,Y,Z will be used as reference in the fault finding flow chart.
First always check the LED on the service board.
If it does not glow check different camera panels' connections on service board, and power supply.

Note: Measurements on various connector pins can be also done on the Service Board (4822 212 30881).

Sensor defect:

V: Check the pulses and DC-levels on the pins of the sensor (pins 1-16) item 7025.
Pin 1: RS-pulse 9.5 MHz 4-8.5 V,
Pin 2: DC 15 V,
Pin 3, 14: ground,
Pin 4: sensor output (DC=10 V),
Pin 5: DC 15 V,
Pins 6,7,8,9: HF-PULSE (0-5 V),
Pins 10, 12: Line Frequent pulse (0-(-8)V
Pins 11, 13: Line + Frame Frequent pulse (0-(-8 V)-17 V
If any signal is missing, the sensor 7025 is defected.

Sensor board defect:

W: If the following timing pulses are present it shows the processor board is ok.

- IDI on connector 10-T1 Line frequency/2 pulse
- PBLK on connector 17-T1 Line frequency pulse
- ENCP on connector 19-T1 Line frequency pulse
- CBLK on connector 18-T1 Line frequency pulse
- SYNC on connector 16-T1 line frequency pulse
- VD on connector 13-T1 field frequent pulse

X: and now if the signal on one of the following test points is missing the defect is on the sensor board:

- Luminance on connector 15-T2, 5-T2, TP234 929-7290)
- Chrominance on connector 3-T2, 2-T2
- Iris on connector 16-T2 (video signal of approx. 1Vpp on 1.8 Vdc)
- 9.5 MHz clock on connector 2-T1

Processor board defect:

Y: If the signals on following test points are present it shows Sensor Board is ok.

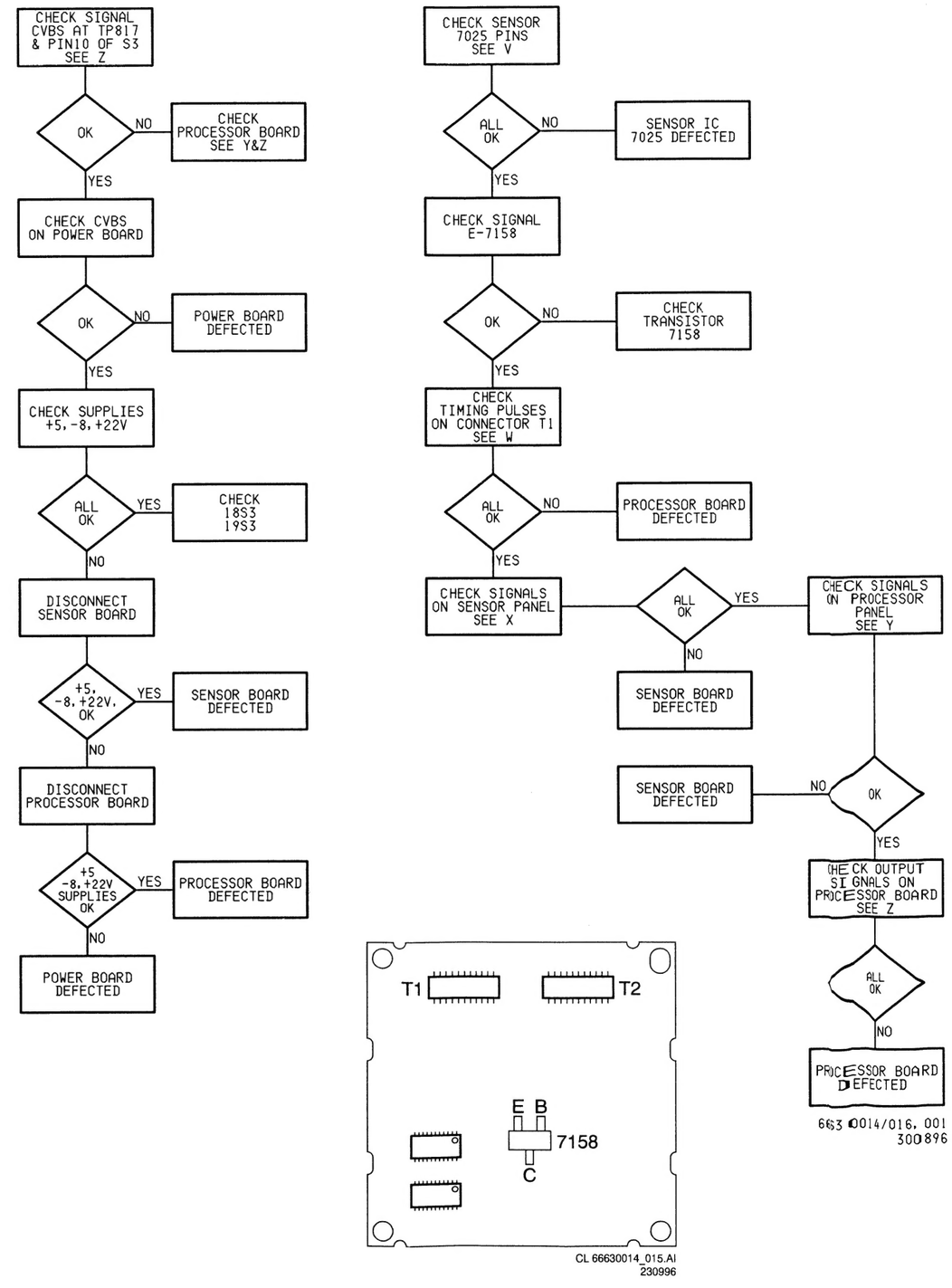
- Luminance on connector 15-P2
- Chrominance on connector 3-P2 and 2-P2
- Iris on connector 16-P2
- 9.5 MHz clock on connector 2-P1

Z: and now if no signal is present on one of following test points the processor board is defective.

- CVBS on connector 11-P3
- Chroma on connector 2-P5
- U on connector 1-P5 (only 4170)
- V on connector 6-P5 (only 4170)

Further if one of the timing pulses mentioned above is missing also the fault is on the processor board.

Fault FINDING tree(S) on board level



Power board defect:

If the signal on the connector 11-P3 and 10-S3 is present, but no output signal at S1 connector thenthe problem is on the power board.

If one of the three DC-voltages;
+5V (on connector 7-P1), -8V (on connector 8-P1) and +22V (on connector 5-P1) is missing then do the following actions.

First disconnect sensor board;
* problem is solved → sensor board is defective.

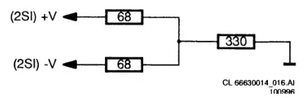
If not, disconnect processor board;
* problem solved → processor board is defective.

If the problem still remains → power board is defective.

- If the camera does not function, check if the cable (item 53) is correctly connected between connectors P3 on processor board and connector S3 on power board. Please see under NOTES (point 3) for the correct connection.

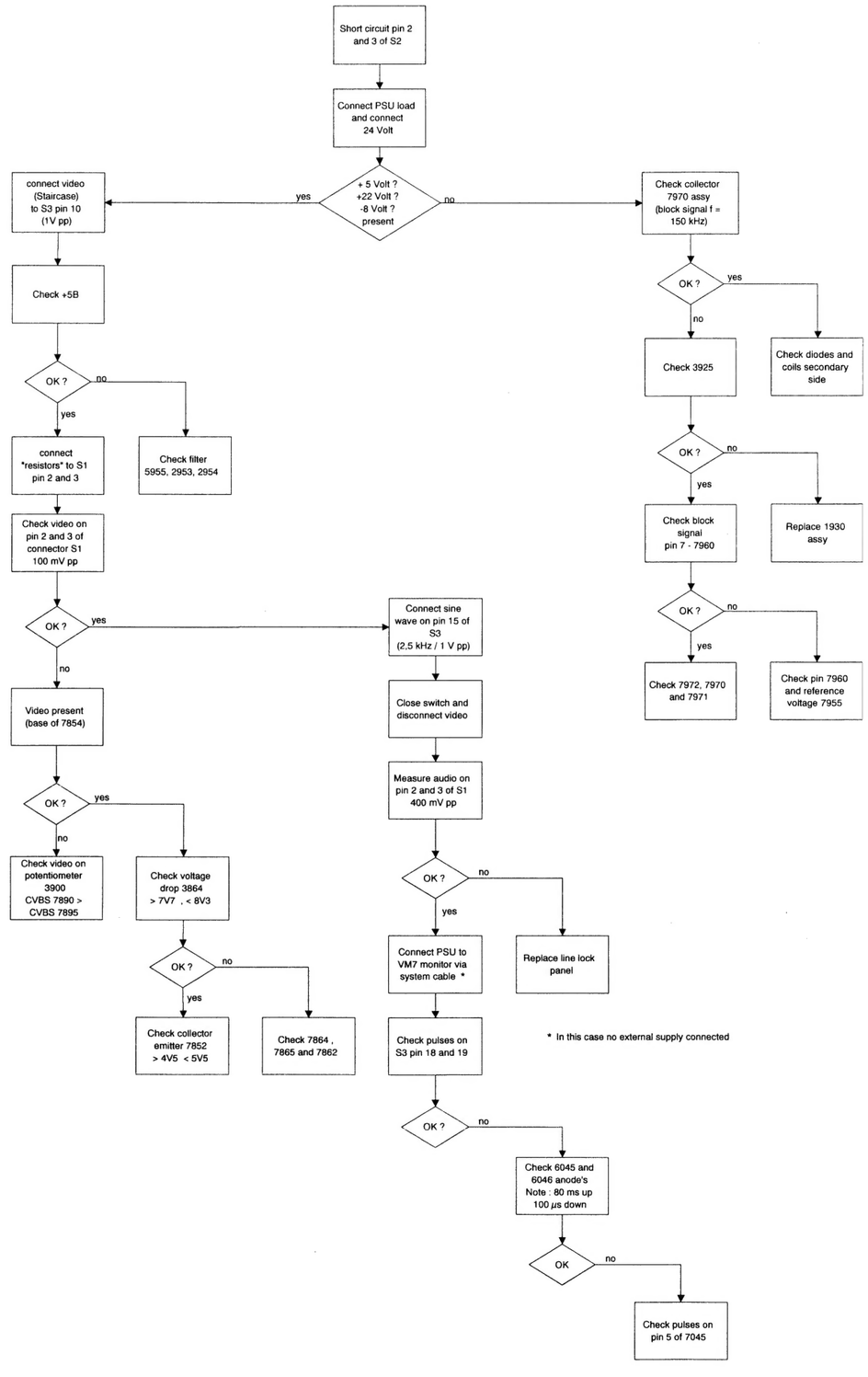
Personal Notes:

Note:
To check / repair the power board (as stand alone board) the following tools are needed:
- load resistors;
  18R for the +5V (7S3)
  1k1 for the +22V (5S3)
  10k for the -8V (8S3)
- a resistor network

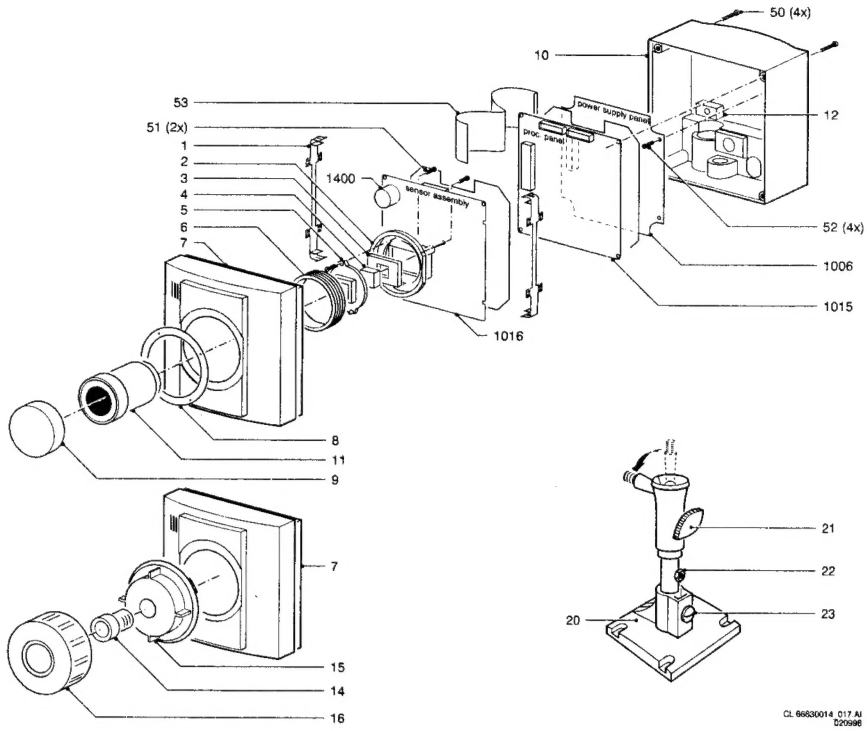


- a VM7 observation monitor (e.g. VSS7370/00T)
- a video pattern generator
- the X1C service test board (4822 212 30881)

Fault finding tree power board



12. Spare Parts Lists



POSITION NUMBER	SERVICE CODE	DESCRIPTION
1	4822 404 31296	Spacer
2	4822 255 70286	Sensor interface block
3	4822 466 62405	Gasket
4	4822 381 20181	Optical low-pass filter
5	4822 432 60782	Mask
6	4822 532 12249	Adaptor-ring
7	4822 432 60777	Housing front part
8	4822 532 12251	Retaining-ring
9	4822 462 71776	Dust cap
10	4822 441 11811'	Housing back part
11	4822 381 11473	CS lens 4 mm F1.2
12	4822 265 10753	Power jack S2
13	4822 466 11333	Optical block assy (VCM7137/..)
13	4822 466 11334	Optical block assy (VC71375T-TC71375T)
13	4822 218 11521	Optical block assy (VCM7177/..)
13	4822 218 11519	Optical block assy (VC71775T-TC71775T)
14	4822 381 11699	Fixed lens 4 mm
15	4822 466 11335	Lens interface
16	4822 462 10806	Lens cap
20	4822 462 10507	Tripod assy- grey
21	4822 413 41884	Knob for tripod- grey
22	4822 502 21582	Screw M5*8 for tripod
23	4822 505 10665	Lock nut M5 for tripod
50	4822 502 13887	Torx screw 2*20 (4*)
52	4822 502 13886	Screw 2*6 (4*)
53	4822 323 50158	Cable P3-S3
	Various:	
	4822 321 62696	Camera cable 15 meter
T1	4822 265 51361	22 pins connector
T2	4822 265 51361	22 pins connector
P1	4822 267 60364	22 pins connector
P2	4822 267 60364	22 pins connector
P3	4822 267 60365	20 pins connector
1400	4822 242 30176	Microphone

POSITION NUMBER	SERVICE CODE	DESCRIPTION
	REPAIRABLES:	These unit can be returned to PCS for repairing at factory, see chapter 7.
1015	4822 214 11846	Processor panel assy (PAL)
1015	4822 214 11837	Processor panel assy (NTSC)
1016	4822 214 11839	Sensor panel assy (PAL- fixed)
1016	4822 212 31734	Sensor panel assy (PAL- CS)
1016	4822 214 11835	Sensor panel assy (NTSC-fixed)
1016	4822 212 31735	Sensor panel assy (NTSC-CS)
	AUXILIARY TOOLS	
	4822 321 21988	RS232 cable 9p male-female 1 meter
	4822 321 22822	RS232 cable 9p male-female 3 meter
	4822 212 30881	Service board complete
	4822 727 20001	Alignment software guide with floppy

POWER PANEL PARTS

1006	4822 214 11842	POWER PANEL

Various

S1	4822 267 41183	4 pins connector
S3	4822 265 51362	20 pins connector
S4	4822 267 41109	4 pins connector
S5	4822 265 10754	9 pins connector
1900	4822 277 21765	AUDIO SWITCH
1930	4822 117 12567	TRANSISTOR-RESISTOR ASSY
1940	4822 214 11844	LINE LOCK PANEL

2852	4822 124 42058	33µF 20% 50V
2853	4822 126 12944	47nF 10% 50V
2854	4822 124 80653	6.8µF 20% 6.3V
2858	4822 122 33788	82pF 5% 50V
2859	4822 126 12944	47nF 10% 50V
2860	4822 124 41579	10µF 20% 50V
2866	4822 126 12944	47nF 10% 50V
2875	4822 124 42058	33µF 20% 50V
2880	5322 122 32531	100pF 5% 50V
2881	4822 124 41579	10µF 20% 50V
2882	4822 126 12944	47nF 10% 50V
2883	4822 126 11671	33pF
2884	4822 122 33785	68pF 5% 50V
2899	4822 126 13193	4.7nF 10% 63V
2918	4822 126 13192	2.2nF 10% 63V
2919	4822 126 13192	2.2nF 10% 63V
2920	4822 126 13192	2.2nF 10% 63V
2921	4822 126 13192	2.2nF 10% 63V
2925	4822 124 42058	33µF 20% 50V
2926	4822 126 12944	47nF 10% 50V
2927	4822 124 42058	33µF 20% 50V
2929	4822 126 12944	47nF 10% 50V
2930	4822 126 11219	1µF 20% 16V
2936	4822 126 12944	47nF 10% 50V
2941	4822 124 42058	33µF 20% 50V
2942	4822 124 42058	33µF 20% 50V
2943	4822 126 12944	47nF 10% 50V
2945	4822 124 42058	33µF 20% 50V
2946	4822 126 12944	47nF 10% 50V
2952	4822 126 12944	47nF 10% 50V
2953	4822 124 41579	10µF 20% 50V
2954	4822 126 12944	47nF 10% 50V
2955	5322 126 11583	10nF 10% 63V
2956	4822 126 12944	47nF 10% 50V
2957	4822 126 12777	470pF 10%
2958	4822 124 80653	6.8µF 20% 6.3V
2967	4822 126 13192	2.2nF 10% 63V
2968	4822 126 12944	47nF 10% 50V
2969	4822 126 12944	47nF 10% 50V
2970	5322 122 32531	100pF 5% 50V
2972	4822 126 13192	2.2nF 10% 63V

3850	4822 051 30394	390k 5% 0.062W
3851	4822 051 30472	4k7 5% 0.062W
3852	4822 051 30333	33k 5% 0.062W
3853	4822 051 30223	22k 5% 0.062W
3854	4822 051 30223	22k 5% 0.062W
3855	4822 117 12519	47Ω 1% 0.1W
3856	4822 117 12521	68Ω 1% 0.1W
3857	4822 051 30473	47k 5% 0.062W
3858	4822 117 12519	47Ω 1% 0.1W
3859	4822 117 12521	68Ω 1% 0.1W
3860	4822 051 30229	22Ω 5% 0.062W
3862	4822 117 12522	24Ω 1% 0.1W
3863	4822 117 12521	68Ω 1% 0.1W
3864	4822 051 10102	1k 2% 0.25W
3865	4822 117 12521	68Ω 1% 0.1W
3866	4822 117 11597	510Ω 1% 0.1W
3867	4822 117 12521	68Ω 1% 0.1W
3878	4822 117 11496	62Ω 1% 0.1W
3879	4822 051 30759	75Ω 5% 0.062W
3880	4822 117 11448	180Ω 1% 0.1W
3885	4822 051 30101	100Ω 5% 0.062W
3886	4822 051 30393	39k 5% 0.062W
3887	4822 051 30103	10k 5% 0.062W
3888	4822 051 30103	10k 5% 0.062W
3889	4822 051 30103	10k 5% 0.062W
3890	4822 117 11448	180Ω 1% 0.1W
3891	4822 051 30229	22Ω 5% 0.062W
3895	4822 117 11448	180Ω 1% 0.1W
3896	4822 051 30229	22Ω 5% 0.062W
3897	4822 051 30103	10k 5% 0.062W
3898	4822 051 30103	10k 5% 0.062W
3899	4822 051 30103	10k 5% 0.062W
3900	4822 101 11672	1k 0.3W
3905	4822 051 30221	220Ω 5% 0.062W
3925▲	4822 052 10102	1k 5% 0.33W
3926	4822 051 30473	47k 5% 0.062W
3927	4822 051 30474	470k 5% 0.062W
3928	4822 117 11496	62Ω 1% 0.1W
3929	4822 051 30105	1M 5% 0.062W
3936	4822 051 30471	470Ω 5% 0.062W
3937	4822 051 30102	1k 5% 0.062W
3945	4822 117 11454	820Ω 1% 0.1W
3955	4822 117 11145	4k7 1% 0.1W
3956	4822 117 10833	10k 1% 0.1W
3960	4822 051 30472	4k7 5% 0.062W
3961	4822 051 30473	47k 5% 0.062W
3962	4822 051 30473	47k 5% 0.062W
3963	4822 051 30472	4k7 5% 0.062W
3964	4822 051 30102	1k 5% 0.062W
3967	4822 051 30333	33k 5% 0.062W
3968	4822 117 10833	10k 1% 0.1W
3969	4822 117 10833	10k 1% 0.1W
3971	4822 051 30222	2k2 5% 0.062W
3972	4822 051 30102	1k 5% 0.062W
3973	4822 051 30103	10k 5% 0.062W
3974	4822 051 30681	680Ω 5% 0.062W

5850	4822 157 11019	1U5 FIXED COIL
5851	4822 157 11019	1U5 FIXED COIL
5880	4822 157 11019	1U5 FIXED COIL
5885	4822 157 70794	47µH
5905	4822 146 10648	TRANSFORMER
5918	4822 157 70794	47µH
5919	4822 157 70794	47µH
5920	4822 157 70794	47µH
5921	4822 157 70794	47µH
5930	4822 157 71322	470µH
5940	4822 146 10649	TRANSFORMER
5942	4822 157 70794	47µH
5950	4822 157 11086	COIL
5955	4822 157 70778	COIL

6841	4822 130 83757	BAS216
6850	5322 130 80214	BAS28
6852	4822 130 33703	BZX84-C2V4
6924	4822 130 31438	1N4001GP
6925	4822 130 31438	1N4001GP
6935	4822 130 10243	2N5064
6936	4822 130 33707	BZX84-B6V2
6940	4822 130 83504	D1FS4
6941	5322 130 33764	BAV23
6945	4822 130 83757	BAS216
6946	5322 130 80255	BZX84-C8V2

7852	5322 130 41982	BC848B
7853	5322 130 41983	BC858B
7854	5322 130 41983	BC858B
7862	4822 130 10706	IMT1
7864	5322 130 41982	BC848B
7865	5322 130 41982	BC848B
7890	5322 130 41982	BC848B
7895	5322 130 41982	BC848B
7925	5322 130 41982	BC848B
7926	5322 130 41982	BC848B
7929	5322 130 41982	BC848B
7955	4822 209 14933	TL431IZ
7960	5322 209 70225	LM393D
7971	5322 130 41983	BC858B
7972	5322 130 41982	BC848B

Complaint description forms

FAULT DESCRIPTION FORM

Model number of the defective product :

Date of failure: .. - .. - 19..

Serial number of the defective product : **A/OP...** 9..... .....

Country : .....

Fault description :

Please add this description form in the box with the defective panel !!

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Model number of the defective product :

Date of failure: .. - .. - 19..

Serial number of the defective product : **A/OP**.... 9..... .....

Country : .....

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Fault description :

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